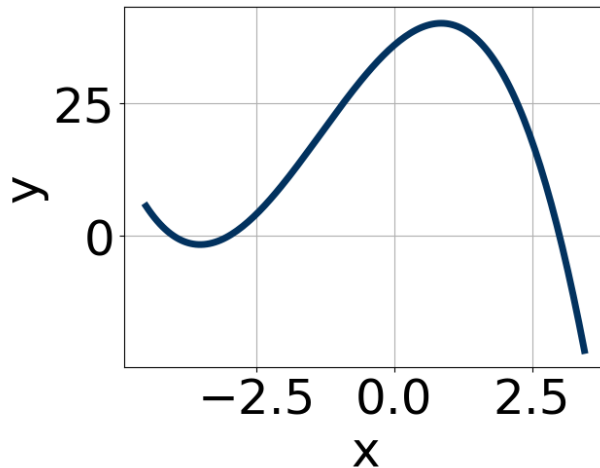1. Which of the following equations *could* be of the graph presented below?
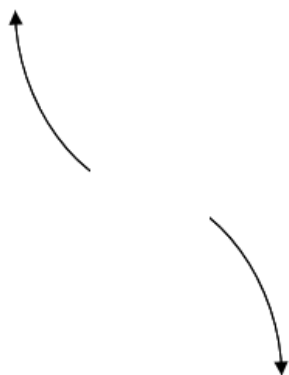

A. $-20(x-3)^6(x+4)^{11}(x+3)^5$

B. $-3(x-3)^7(x+4)^9(x+3)^{11}$

C. $6(x-3)^4(x+4)^{11}(x+3)^9$

D. $-3(x-3)^4(x+4)^8(x+3)^9$

E. $18(x-3)^5(x+4)^5(x+3)^{11}$
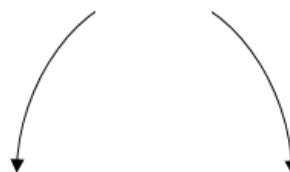
2. Describe the end behavior of the polynomial below.

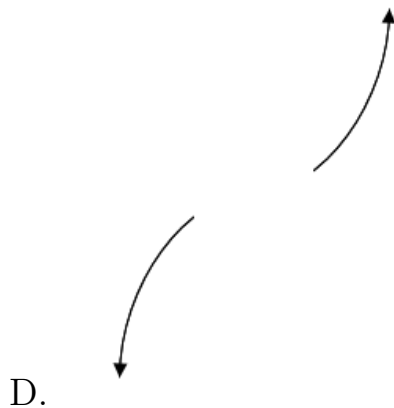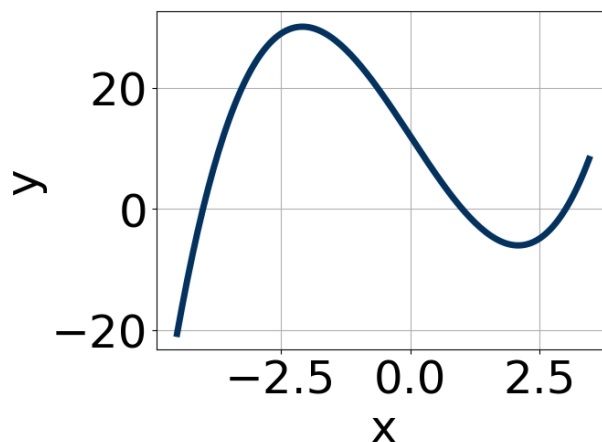$$f(x) = 6(x+4)^5(x-4)^6(x-3)^4(x+3)^5$$

A.

B.

C.

D.

E. None of the above.

---

3. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-5 + 5i \text{ and } -3$$

A. $b \in [-1, 9], c \in [-8, 1],$ and $d \in [-15, -11]$

B. $b \in [11, 16], c \in [80, 82],$ and $d \in [147, 158]$

C. $b \in [-1, 9], c \in [7, 11],$ and $d \in [11, 19]$

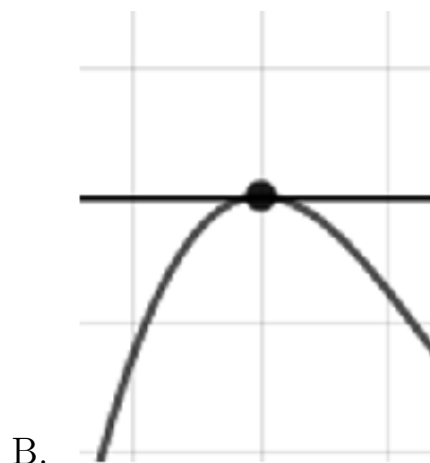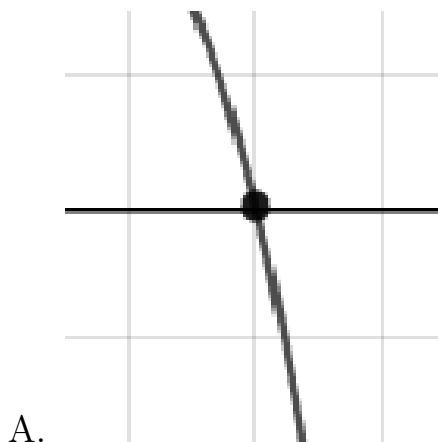D. $b \in [-19, -12], c \in [80, 82],$ and $d \in [-158, -146]$

E. None of the above.

---

4. Which of the following equations *could* be of the graph presented below?

A. $3(x-3)^4(x+4)^8(x-1)^5$

B. $-12(x-3)^4(x+4)^5(x-1)^7$

C. $9(x-3)^7(x+4)^{11}(x-1)^{11}$

D. $-12(x-3)^9(x+4)^{11}(x-1)^5$

E. $10(x-3)^6(x+4)^{11}(x-1)^7$

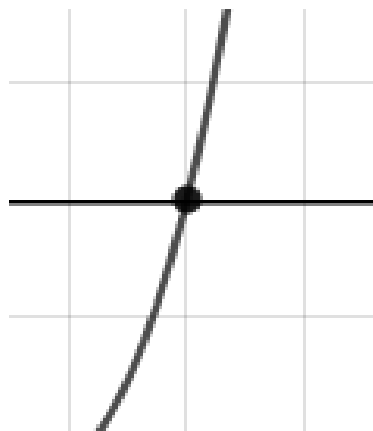5. Describe the zero behavior of the zero $x = -8$ of the polynomial below.

$$f(x) = 9(x+2)^{11}(x-2)^7(x+8)^7(x-8)^6$$

A.

B.

C.   D.

E. None of the above.

---

6. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{5}{2}, \frac{-1}{3}, \text{ and } \frac{-2}{3}$$

A. $a \in [17, 23], b \in [19, 28], c \in [-45, -36],$ and $d \in [8, 11]$

B. $a \in [17, 23], b \in [-27, -24], c \in [-45, -36],$ and $d \in [-17, -9]$

C. $a \in [17, 23], b \in [50, 54], c \in [3, 12],$ and $d \in [-17, -9]$

D. $a \in [17, 23], b \in [58, 75], c \in [44, 53],$ and $d \in [8, 11]$

E. $a \in [17, 23], b \in [-27, -24], c \in [-45, -36],$ and $d \in [8, 11]$

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7. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$4 + 5i \text{ and } -2$$

A. $b \in [1, 3], c \in [-4.5, -2.7],$ and $d \in [-10.1, -9.4]$

B. $b \in [1, 3], c \in [-2.53, -1.56],$ and $d \in [-8.9, -6.6]$

C. $b \in [6, 11], c \in [22.96, 25.33],$ and $d \in [-83.9, -75.9]$

D. $b \in [-7, -3], c \in [22.96, 25.33],$ and $d \in [80.5, 82.2]$

E. None of the above.

---

8. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{7}{5}, \frac{-1}{4}, \text{ and } \frac{2}{5}$$

A. $a \in [97, 103], b \in [75, 77], c \in [-81, -77],$ and $d \in [6, 19]$

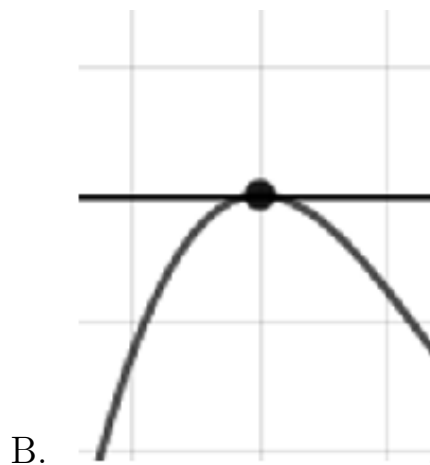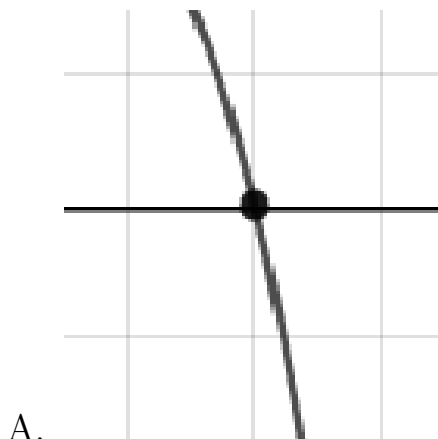B. $a \in [97, 103], b \in [-163, -151], c \in [5, 14],$ and $d \in [-14, -13]$

C. $a \in [97, 103], b \in [-163, -151], c \in [5, 14],$ and $d \in [6, 19]$

D. $a \in [97, 103], b \in [147, 156], c \in [5, 14],$ and $d \in [-14, -13]$

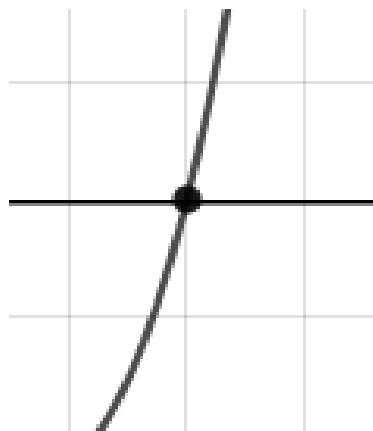E. $a \in [97, 103], b \in [119, 127], c \in [-37, -25],$ and $d \in [-14, -13]$

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9. Describe the zero behavior of the zero $x = -6$ of the polynomial below.

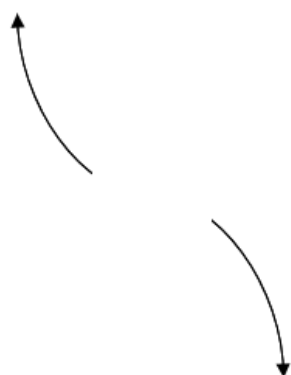$$f(x) = 9(x - 6)^5(x + 6)^{10}(x - 9)^7(x + 9)^{11}$$
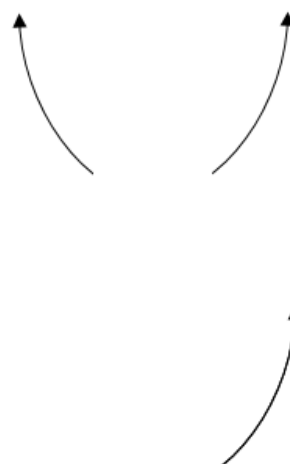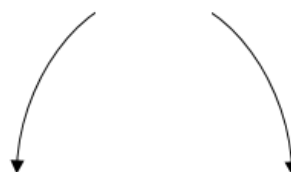
A.

B.

C.

D.

E. None of the above.

---

10. Describe the end behavior of the polynomial below.

$$f(x) = -8(x-2)^4(x+2)^5(x+9)^5(x-9)^6$$

C.

A.

B.

D.

E. None of the above.